Math 1553 Worksheet §5.3 (and some more practice with §5.2)

1. Answer yes / no / maybe. In each case, A is a matrix whose entries are real.

a) If A is a 3×3 matrix with characteristic polynomial $-\lambda(\lambda - 5)^2$, then the 5-eigenspace is 2-dimensional.

b) If A is an invertible 2×2 matrix, then A is diagonalizable.

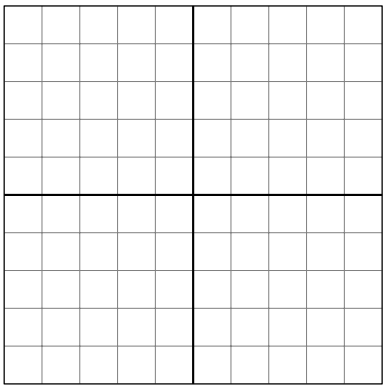
c) If A and B are 3×3 matrices and both have eigenvalues $-1, 0, 1$, then A is similar to B.

d) Suppose A is a 7×7 matrix with four distinct eigenvalues. If one eigenspace has dimension 2, while another eigenspace has dimension 3, then A must be diagonalizable.

2. Consider the matrix

$$A = -\frac{1}{5}\begin{pmatrix} 8 & 3 \\ 2 & 7 \end{pmatrix}.$$

a) Find, draw, and label the eigenspaces of A.



b) Compute A^{100}.